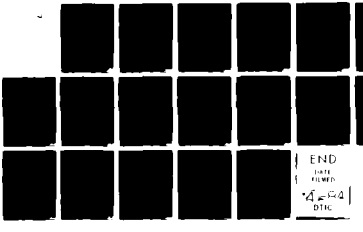
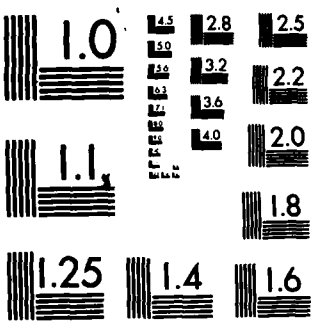
AD-A138 925 GEOGRAPHICAL NAMES OF THE MAIN RELIEF SECTIONS OF THE SEAFLOOR IN THE ARCTIC BASIN(U) NAVY ELECTRONICS LAB SAN DIEGO CA A F TRESHNIKOV ET AL. JUN 67 NEL-116 1/1

UNCLASSIFIED F/G 8/10 NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

(12)

NEL Translation 116

GEOGRAPHICAL NAMES OF THE MAIN RELIEF SECTIONS OF THE SEAFLOOR IN THE ARCTIC BASIN

by

A. F. Treshnikov, L. L. Balakshin, N. A. Belov,
R. M. Demenitskaia, V. D. Dibner, A. M. Karasik,
A. O. Shpaikher and N. D. Shurgaeva

Translated from

Problemy Arktiki i Antarktiki, no. 27
p. 1-25

ABSTRACT: This document formally establishes the names of Arctic geographic and geomorphic features to be used in the Russian literature.

KEYWORDS: Arctic, Geography, Geomorphology, Names

NEL Translation 116

GEOGRAPHICAL NAMES OF THE MAIN RELIEF SECTIONS OF THE SEAFLOOR IN THE ARCTIC BASIN

By

A. F. Treshnikov, L. L. Balakshin, N. A. Belov,
R. M. Demenitskaia, V. D. Dibner, A. M. Karasik,
A. O. Shpaikher and N. D. Shurgaeva

Translated from

Problemy Arktiki i Antarktiki, no. 27
p. 1-25

A-1

June 1967

GEOGRAPHICAL NAMES OF THE MAIN RELIEF SECTIONS OF THE SEAFLOOR IN THE ARCTIC BASIN

Authors: A.F. Treshnikov, L.L. Balakshin, N.A. Belov, R.M. Demenitskaia, V.D. Dibner, A.M. Karasik, A.O. Shpaikher and N.D. Shurgaeva.

Date: 1 9 6 7

Ref.: Problems of the Arctic and Antarctic Regions; pages 1 - 25.

GEOGRAPHICAL NAMES OF THE MAIN RELIEF SECTIONS OF THE SEAFLOOR IN THE ARCTIC BASIN

The energetic efforts in research on the Arctic Basin, conducted by scientists of the USSR and USA during the last decade, rapidly widened knowledge of the relief features of this seafloor. Discoveries followed each other with such speed that information about them had no time to spread not only to other countries, but even among scientists of the same country. The result was that some submarine ridges and basins were given unsuitable Russian and American names which, in turn, caused confusion, intensified by the absence of generally accepted naming inside the USSR, as well as inside the USA.

In order to create uniformity in geographical names of the entire Arctic Ocean among scientists of the USA, a small conference of the competent and interested specialists was called by W.K. Lyon

p.1

(U.S. Navy Electronics Laboratory) in 1966. The participants in this conference: N.A. Ostenso (University of Wisconsin), M.A. Beal (U.S. Navy Electronics Laboratory), A. Molloy (U.S. Navy Electronics Laboratory), F. Edvalson (U.S. Navy Oceanographic Office), and K. Hunkins (Lamont Geological Observatory) worked out a proposition to standardize the names of various sections of the seafloor in the Arctic Ocean. Their suggestions were presented in a separate article, a copy of which, prior to its publication, was mailed to the Director of the Arctic and Antarctic Institute, A.F. Treshnikov and to a number of other

p.2 Soviet scientists.

In the forwarding letter, N.A. Ostenso underlined that the purpose of this article was to urge other scientists to standardize the names of individual relief sections in the Arctic Ocean. In conformity with this wish, an initiative group was formed to create a mutually acceptable system of geographical names; representatives of the Arctic and Antarctic Institute - L.L. Balakshin, N.A. Belov, A.F. Treshnikov (Chairman) and A.O. Shpaikher - and representatives of the Geological Institute of the Arctic Region - R.M. Demenitskaia, V.D. Dibner, A.M. Karasik and N.D. Shurgaeva - became members of this group. The group decided from the start to limit itself to the most essential problem, viz. that of uniformity of the names inside the deepwater section of the Arctic Ocean near the Pole (the Arctic Basin).

Considerable difficulty had to be surmounted when solving even this limited problem. First of all, it was necessary to subject the entire system of naming to the most recent geomorphological chart

p.2

of the Arctic Basin. This chart was prepared by V.D. Dibner and N.D. Shurgaeva on the basis of the geomorphological chart of the Arctic Ocean (16), the physicogeographical diagram of this basin (18, 31), as well as the bathymetric charts by Ia.Ia. Gakkel (7, 34), N.A. Belov (5) and A.F. Treshnikov (38) and the new bathymetric chart of a considerable section of the Arctic Basin which was kindly made available to us in 1967 by Professor N.A. Ostenso from the USA.

Considerable obstacles were also encountered when selecting the names already in use. Here, it was necessary to consider not only the history of the origin of the names in connection with the actual discoveries and the questions of priorities concerning these two points, but also the publication of the names already in exist-

p.3 ence on the official and widely used charts and, first of all, on the map of the "Northern Hemisphere" (scale 1 : 25,000,000), published by the Main Administration of Geodesy and Cartography (GUGK), USSR, in 1964, circulation 13,000[1]. When new names were selected, it was necessary also to consider such aspects as the possibility of their accurate translation and obtaining adequate versions in English.

Footnote on page 3: 1 - On this map, the bathymetry of the Arctic Basin is presented according to Ia.Ia. Gakkel's model of 1963.

As the result of careful processing of all initial data and discussions which took place in the Arctic and Antarctic Institute, the Geological Institute of the Arctic, the Institute of Oceanology, AS USSR, and in the Polar and Oceanographical Commissions of the Geographical Society, a single decision was reached concerning the naming

p.3

of individual sections in the seafloor topography of the Arctic Basin.

Proceeding from the necessity to maintain a certain continuity in the geographical names, adopted earlier, it is reasonable to preserve on Soviet maps the name, "Northern Ice Ocean", accepted by resolution of the TsIK Presidium of the USSR (Protocol #10) on June 27, 1935. The Northern Ice Ocean includes the Arctic Basin (the abyssal zone near the Pole, outlined by the Continental Slope); it also includes the Northern-European Basin (the Greenland, Norwegian, Barents and White Seas), as well as the Arctic Seas of Siberia, viz.: the Kara, Laptev, East Siberian and Chukchi Seas.

At the same time, we suggest that the name "Arctic Basin" be established irrevocably for the abyssal zone near the Pole in the

p.4 Northern Ice Ocean. This name was suggested for the first time by Ia.Ia. Gakkel (7), instead of the names used earlier on Russian and Soviet maps, such as "the Polar Basin", "the Central Polar Basin", "the Northern Polar Basin", "the Central Arctic Basin", and others.

Prior to 1948, an idea existed that the seafloor of the Arctic Basin is a single deepwater bowl. This concept, originated as the result of depth measurements by F. Nansen (54), was supported for a while by subsequent investigations directed to bring further accuracy into the bathymetric picture of the Arctic Basin. Depth measurings by the drifting station "North Pole - 1" (30, 38) and those taken during drifts of the icebreaker "G. Sedov" (3, 6, 20) and during the "N - 169" expedition (17, 24) registered relatively great depths.

p.4

Systematic study of the Arctic Basin seafloor commenced with the organization of annual high-latitudes aerial expeditions in 1948; followed in 1950 by a solid base for wide-scope investigations, presented by the drifting stations for scientific research "North Pole", or "SP". Precisely these expeditions began a period of great discoveries in the region of the Arctic Basin seafloor under survey, which coincided in time with significant achievements in the study of seafloor topography in other abyssal regions of the World.

Table 1 shows a list of names of individual features in the seafloor topography of the Arctic Basin, suggested as being in agreement with its orographical chart (Figure 1). The names in this table are shown in through-numbering, but they are placed in three columns, depending upon their origin. Brief data on the history and development of individual elements of the relief are also given in the same order below, as well as arguments in favor of the suggested geographical names.

p.7

The Arctic Basin is divided by three transoceanic ridges and rises. These are: the Mendeleyev Ridge forming one sill with the Alpha Rise; the Lomonosov Ridge; and the Mid-Oceanic Gakkel Ridge.

The Lomonosov Ridge is regarded by us as the zone of divide in the Northern Ice Ocean into two sub-basins which differ in earth crust structure, geostructure and neotectonicsl. These sub-basins are the Amerasia Sub-Basin and the Eurasia Sub-Basin (27). Both names are accepted in accordance with the suggestions of American scientists (42).

p.7

I - THE AMERASIA SUB-BASIN

This sub-basin constitutes the greater part of the Arctic Basin situated from the crest-line of the Lomonosov Ridge to the continental slopes of the Canadian Arctic Archipelago, Alaska and to the Chukchi and Eastern-Siberian Seas. This is an area with aseismic rises of block-folded structure, divided by sub-oceanic deeps.

The main features of the seafloor in this sub-basin were defined after wide investigations during the last 15-17 years by aerial, drifting and marine expeditions of the Soviet Union and the USA (1, 5, 7-9, 18, 19, 29, 31-33, 38, 43, 47, and 55-57).

Seismic profile probing showed a"two-storied" structure and the folded nature of the foundation of the ridges; whereas, the bathymetric-geomorphological and aeromagnetic research indicated the
p.8 controlling importance of dislocations with a break in continuity with regard to the morphostructure of this region as a whole (7, 13, 14, 16, 40, 41, 47, 52, and others).

Large individual sections of the relief of the Amerasia Sub-Basin are examined below: first, its rises, then the deeps.

1. BEAUFORT RISE. This is a submarine rise with the shallowest depth above its terminal being less than 1,000 meters. On the newest bathymetric chart, compiled by N. Ostenso, this elevation in

the seafloor is shown as part of a greater step leaning to the Canadian Shelf in the region of Amundsen Bay. This step is a gradual incline westwards, towards the Canada Deep and typical depths above it are from 1,000 to 1,500 to 2,500 meters.

On the corresponding orographic chart of American scientists (42), this elevation is called "Beaufort Terrace".

2. CHUKCHI RISE. This rise is a prominence of the Chukchi Shelf, jutting out into the ocean and separated from the shelf by a saddle about 50 kilometers wide with depths of about 300 meters. The shallowest places of the Chukchi Rise (250 - 450 meters) are the two flat peaks named by American scientists the "Chukchi" and "North Wind" (46, 47, 48).

Judging by the sum total of the gravimagnetic, geomorphological and geological-petrographical data collected at Stations "SP-2","Charlie" and by the American icebreaker "North Wind", etc. (4, 5, 29, 46, 53, and 55-57), the Chukchi Rise should be interpreted as an area of earth crust of the continental type, about 32 kilometers thick, with a partially exposed crystalline foundation.

3. MENDELEYEV RIDGE. In 1949, the high-latitudes aerial expedition discovered another rise with minimum depth of 1,234 meters east from the Lomonosov Ridge, which had been discovered earlier; this rise stretches from the region of Wrangel Island to the eastern part of the Canadian Arctic Archipelago. It was mentioned without

p.9

any name in articles by M.E.Ostrekin (28), A.F. Laktionov and V.V. Frolov (21). The Geographical Society of the USSR gave to this rise the name of D.I. Mendeleyev, who was an outstanding chemist and one of the initiators of research on the Arctic Region during the pre-revolutionary period (7, 11).

Beginning with 1955, American scien ·ts, mostly using the drifting Stations "T-3", "Charlie" and "Alph , surveyed in detail the depths of the Arctic Basin in that part · .he ridge, which is next to the Canadian Arctic Archipelago (45, 46, 50, 52, etc.). They gave to this trans-Arctic rise their own name, the Alpha Ridge (rise, or "cordillera"), after the name of their drifting station. At the present time, taking into consideration the contributions of the Soviet and American scientists, it seems reasonable to preserve the independent names for the separate parts of this vast trans-Arctic rise, viz.: the Mendeleyev Ridge and the Alpha Rise; all the more so, as both morphostructures have different orographic charts and are more or less clearly divided by a gap-like ravine.

And so, the Mendeleyev Ridge is a linearly isometric morpho-structure, stretching from the Chukchi continental slope in the region of the Wrangel Island meridian to the central section of the Lomonosov
p.10 Ridge. The Mendeleyev Ridge is separated from the Lomonosov Ridge by the Arlis Gap[1] (29). The shallowest depths above the Mendeleyev Ridge are about 1,500 meters.

Footnote on page 10: 1 - Gap: a narrow depression of a non-rift type, dividing major submarine rises (this is American terminology).

p.10

4. ALPHA RISE. This rise is a submarine structure with minimum depths of 1,400 meters and less; it drops steeply (to 22°) for 600 meters to the adjacent deeps. In the sub-Canadian section, this rise is a complex of elevations which spread fanwise (50, 52, 53, and 55-57). In its central part, the Alpha Rise joins the Lomonosov Ridge, from which however it is separated for 200 kilometers by the Marvin Gap.

5. LOMONOSOV RIDGE. In 1948, the participants in the high-latitudes aerial hydrological expedition, Ia.Ia. Gakkel and V.T. Timofeev, discovered a depth of 1,290 meters at the surveying station in the center of the Arctic Basin. This depth and measurement data obtained north of the New Siberian Islands by the drifting ice-breaker "G. Sedov", as well as the difference between the benthic temperatures in the western and eastern sections of the Arctic Basin, prompted the scientists to suggest the presence of a solid submarine ridge between the Soviet and Canadian Arctic Regions; this ridge was later named the Lomonosov Ridge[2].

Footnote on page 10: 2 - Thus were justified the hypothetical structures of several of our own (15, 25) and foreign (49, 59) scientists concerning the existence of regional elevation in the seafloor of this section of the Arctic Basin.

---

p.11 Subsequent investigations by I.V. Maksimov (26), M.E. Ostrekin (28), V.T. Timofeev (36, 37), A.F. Treshnikov (38), and others defined the importance of the Lomonosov Ridge in the formation of the hydrological regime in the Arctic Basin.

p.11

During 1950-1954, the high-latitudes aerial expeditions and the drifting stations brought further accuracy into the configuration and depth of the Lomonosov Ridge, when a new minimum depth was found of only 954 meters. In this connection, a more detailed bathymetric chart of the Arctic Basin was compiled and published in the IZVESTIIA of the Academy of Sciences of the USSR (27). In the text of this publication, it was mentioned that the Presidium of the Academy of Sciences of the USSR approved the suggestion by the Arctic Institute to name this ridge after the great Russian scientist , M.V. Lomonosov. The discoveries by the Soviet Polar scientists were widely publicized (8, 18, 21, 22, 28 and 38).

The Lomonosov Ridge is a most remarkable trans-Arctic morpho-structure which stretches across the region of the North Pole, is 1,800 kilometers long and from 60 to 200 kilometers wide. With steep slopes, especially the one facing the Amundsen Deep, the ridge has a levelled top surface with minimum depths of from 960 to 1,050 meters (7, 9 and 11). In relation to the bed of the Makarov and Podvodnikov Deeps, the ridge towers to 3,300 meters, and to 3,700 meters above the Amundsen Deep, which fact underlines a higher bathymetric level of the two first deeps and the entire Pacific-Arctic province as a whole.

6. GEOFIZIKOV SPUR. This is a projection of the Lomonosov Ridge which separates the Makarov Deep from the Podvodnikov Deep and was defined by both American and Soviet scientists (the name was suggested by A.F. Treshnikov).

p.12

7. MARVIN SPUR. This spur was discovered by American and Soviet scientists. It is situated between the Lomonosov Ridge and Alpha Rise (42, 31).

8. MARVIN GAP. It was discovered by American and Soviet scientists. According to data of drifting stations, this is a narrow depresssion (to 3,500 meters deep), covered by a mass of uncompressed and lightly compressed sediments to 1,500 - 2,000 meters thick (44, 45, 52 & 53). The Marvin Gap separates the Lomonosov Ridge from the Alpha Rise.

9. ARLIS GAP. This gap was discovered by American scientists (42). It is a depression 500 kilometers long and 150 kilometers wide, with maximum depths to 3,500 meters. The Arlis Gap separates the Chukchi Rise from the Mendeleyev Ridge.

10. CHARLIE GAP. It was found by American scientists (42). Charlie Gap separates the Lomonosov Ridge from the Mendeleyev Ridge.

11. SOTRUDNICHESTVA GAP. This gap was discovered by Soviet scientists (5), but is defined here for the first time as suggested by N.A. Belov. Morphologically, it is a deep ravine with convex slopes of complex outlines. The greatest depth here equals 2,700 meters. The gap separates the Mendeleyev Ridge from the Alpha Rise.

p.12

12. CANADA DEEP. This is the largest deep in the Amerasia Sub-Basin with maximum depths to 3,900 meters (42, 55).

13. CANADA ABYSSAL PLAIN. See Paragraph 12 (42).

14. MAKAROV DEEP. This deep was discovered by Soviet scientists in 1950. In the beginning, it was understood that this name meant the vast deep, stretching southwards to the Siberian continental slope. Now, according to the latest bathymetric chart
p.13 by Ia.Ia. Gakkel (see the map "Northern Hemisphere") and geomorphological map of the Northern Ice Ocean(16), the Makarov Deep is a depression, situated in the region near the Pole, between the Lomonosov Ridge and Alpha Rise and separated in the south from the Fedvodnikov Deep by the Geofizikov Spur (a spur of the Lomonosov Ridge).

15. FLETCHER ABYSSAL PLAIN. This plain was found by American scientists and is the central, deepest part of the Makarov Deep (42).

16. FEDVODNIKOV DEEP. This deep is locked in between the New Siberian continental slope and the Lomonosov and Mendeleyev sills (see the map "Northern Hemisphere").

17. TOLL ABYSSAL PLAIN. Bathymetric data and the results of seismic probing show that the large central and southern parts of

p.13

the seafloor in the Podvodnikov Deep form the Toll Abyssal Plain, gradually inclined northwards and covered by a mass of uncompressed sediments to 1.0 - 1.5 kilometers thick and over (13, 14 and 55-57).

American authors (42) refer to this abyssal plain as the Wrangel Plain.

18. "SP" DEEP. The smallest deep in the Arctic Basin, only about 150-200 kilometers across, is triangular in shape. This deep is locked in between the continental slope of the Chukchi Shelf, Chukchi Avantshelf and the Mendeleyev Ridge. We define this deep mainly according to bathymetric data obtained by the drifting Station "SP-2".

The "SP" Deep (the name was suggested by T.I. Gaponenko)
p.14 approximately corresponds in its position to the Chukchi Abyssal Plain (Chukchi Plain) in the corresponding American chart (42).

II. EURASIA SUB-BASIN

The Eurasia Sub-Basin constitutes that part of the Arctic Basin which is situated from the Lomonosov Ridge to the Continental Slope of Greenland and the Spitzbergen-Northland Slope. This is a typical oceanic part of the Arctic Basin in its morphostructure and the structure of the earth crust. The main element in the topography here is the Gakkel Ridge which divides this sub-basin into the Nansen and Amundsen Deeps.

p.14

19. GAKKEL RIDGE. This is a mid-oceanic ridge which is the northernmost link in the planetary system of submarine morpho-structures of this type.

The first traces of the existence of this submarine volcanic structure,unique in the Central Arctic Region, were discovered by Soviet scientists in 1957, when the high-latitudes aerial expedition to the Eurasia Sub-Basin discovered several conical mountains of volcanic origin with marks of 1027, 2394, 2883, 2988, etc. meters, with a general background of depths of over 4,000 meters.

Scientific interpretation of these data permitted Ia.Ia. Gakkel to write literally prophetically on the subject that "the seismic belt stretches here from the Atlantic Ocean through Islandia, Jan Mayen Island and the Greenland Sea into the Arctic Basin and further to the estuary of the Lena River. As is known, seismic belts usually coincide with volcanic belts." (8). In 1960, Ia.Ia. Gakkel made this more accurate and wrote about a mid-Arctic ridge (9) and, in particular, for the first time showed on a map one of its peaks
p.15 with the mark of 728 meters, discovered at Station "SP-6" (35). Therefore, Ia.Ia. Gakkel was first to substantiate the supposition of a continuation of the structures of the Mid-Atlantic Ridge into the Arctic Basin.

Somewhat later, B. Heezen and M. Ewing referred to this ridge, mentioning works by Soviet oceanographers and, in particular, the bathymetric chart compiled by Ia.Ia. Gakkel (51). As the result of detailed investigations of this ridge, carried out by Soviet

.15

scientists during the last five years (13, 14, and 29), it was established that this ridge of over 1,000 kilometers in length comprises sub-parallel chains of numerous conical mountains (volcanos?) and their spurs. The shallowest known depth of 400 meters was named the Lenin Komsomol Mountain. The Geographical Society of the USSR approved the name Ia.Ia. Gakkel for this ridge, as the person who discovered it.

Thus, this ridge is a direct continuation of the rift zone of the Mid-Atlantic Ridge and geologically and geomorphologically represents a zone of submarine volcanism, rift cracks, epicenters of earthquakes of short focus and of narrow-linear magnetic anomalies.

20. AMUNDSEN DEEP[1]. This is the deepest abyssal deep in the ocean, situated between the Lomonosov and Gakkel Ridges. It has the most levelled seafloor relief. Its greatest depth is 4,500 meters. Seismic probing by Iu.G. Kiselev (19) established that the sedimentary layer in the Amundsen Deep is to 500 meters thick in its uncompressed section and to 1,500 meters in the compressed section of the deep.

Footnote on page 15: 1 - This name was given to commemorate the landing of R. Amundsen on the ice in this part of the basin during his flight to the North Pole in 1928 (2).

p.16

21. NANSEN DEEP. This is the second deepest abyssal deep in the sub-basin. Its seafloor, being less deep (the average depth is 3,450 meters), in the part adjacent to the Spitzbergen-Northland continental slope is incised by submeridional ravines. In the western part of the deep, the Lenin Komsomol spur is situated (possibly a chain of volcanos). This spur departs at a right angle from the

p.16

Gakkel Ridge along the meridian, coinciding with the axis of the St. Anna Trench, the deep fracture zone which was defined earlier by the aeromagnetic research conducted by D.V. Levin, S.M. Kriukov and A.M. Karasik (23).

22. LENA VALLEY. In 1956, the expedition on board "OB" discovered the "Lena Trench", representing a longitudinal rift valley of the mid-oceanic Gakkel Ridge where it joins the Knipovich Ridge.

23. SEDOV VALLEY.

24. GIDROGRAFOV VALLEY. The Sedov Valley, as well as the Lena Valley and the Gidrografov Valley form a single system of rift valleys, situated echelon-like, of the Knipovich and Gakkel Ridges (see 18).

25. YERMAK RISE. This rise is situated in the southwestern corner of the Nansen Deep. It is a projection of the shelf jutting into the deep, north from Spitzbergen Island. The rise is separated from the deep in the east by the Litke tectonic gap; in the northwest, it joins the Gakkel volcanoria.

26. LITKE GAP[1]. This is a deep depression with convex slopes which are steeper in the lower section. The overall incline of the gap is directed towards the Nansen Deep. The greatest depth

p.17 of the gap equals 5,449 meters, which is also the maximum depth of

p.17

the Northern Ice Ocean.

Footnote on page 16: 1 - It was discovered during the high-latitudes expedition on the icebreaker "F. Litke" in 1955 (3-a and 41-a).

---

27. MORRIS JESUP RISE. This rise was established by American scientists. It is a projection of the North Greenland Shelf.

If the system of names suggested here is accepted not only by Soviet, but also by American scientists, there will be only a comparatively small number of geographical names left, which probably will continue to exist in the two versions, viz.: the Soviet and American. However, even this achievement of mutual effort should be considered highly desirable, especially if we remember that up to the present time in the USSR and USA, there were confusion and lack of coordination concerning geographical names in the Arctic Basin.

This problem, seemingly so simple, but acquiring unexpected acuteness when reaching an agreement among scientists with different points of view, demands great efforts which, the authors hope, will not remain barren.

L I T E R A T U R E

1. Atlasov, I.P., Vakar, V.A., Dibner, V.D., Egiazarov, B.Kh., Zimkin, A.V. and Romanovich, B.S.: New Tectonic Chart of the Arctic Region; DOKLADY, AS USSR, Volume 156, No.6, 1964.

2. Amundsen, R.: Flight to 88° North Lat.; Symposium, Volume 4, L., Izd-vo Glavsevmorputi, 1936.

3. Badigin, K.S.: Crossing the Arctic Ocean on board "G. Sedov"; M. - L., 1940.

3-a. Balakshin, L.L.: High-Latitudes Oceanographic Expedition on board the icebreaker "F. Litke", 1955; Problems of the Arctic Regions, 1957, Issue 1.

4. Belov, N.A., Lapina, N.N.: Seafloor depositions in the central section of the Arctic Ocean; Trudy of the Scientific-Research Institute of Geology of the Arctic Region; Vol. 85, L., 1958.

5. Belov, N.A., Lapina, N.N.: Seafloor depositions in the Arctic Basin: L., Izd-vo "Marine Transport"; 1961.

6. Buinitsky, V.Kh.: Work of the drifting expedition Glavsevmorputi on board "G. Sedov", 1937-1940, Vo. 4, M.-L., Izd-vo Glavsevmorputi, 1951.

7. Gakkel, Ia.Ia.: Science and the Mastering of the Arctic Regions, L., Izd-vo "Marine Transport", 1957.

8. Gakkel, Ia.Ia.: IGY in the Arctic Regions; "Science and Life", 1959, No.1.

9. Gakkel, Ia.Ia.: Research and the Mastering of the Polar Countries; in book: "Soviet Geography", M., Geografgiz, 1960.

p.18

10. Gakkel, Ia.Ia.: Contemporary concept of the Lomonosov Ridge; Data on the Arctic & Antarctic Regions, Issue 1, L., Izd-vo Geogr. Society of the USSR, 1961.

11. Gakkel, Ia.Ia.: Mendeleyev Submarine Ridge; Data on the Arctic and Antarctic Regions, Issue 1, L., Izd-vo Geogr. Society of the USSR, 1961.

p.19 12. Demenitskaia, R.M.: Main features in the earth crust structure according to geophysical data; TRUDY of the Scientific Research Institute of Geology of the Arctic Region; Vol.115, M-L, 1961.

13. Demenitskaia, R.M., Karasik, A.M., Kiselev, G.G.: Summary of studies of the geological structure of the earth crust in the Central Arctic Region by geophysical methods; in symposium: "Problems of the Arctic and Antarctic Regions", Issue 11, L., Izd-vo "Marine Transport", 1962.

14. Demenitskaia, R.M., Karasik, A.M., Kiselev, G.G.: Structure of the earth crust in the Arctic Region; in symposium: "Geology of the floor of the oceans and seas": DOKLADY by Soviet Geologists, International Geological Congress, XXII Session, Problem 16, M., Izd-vo "NAUKA", 1964.

15. Dibner, V.D.: Little known articles by N.G. Shilling in the light of recent geographical discoveries in the Arctic Region; Izd-vo Vsesoiuzn. Geogr. Society, Vol. 91, Issue 1, L, 1959.

16. Dibner, V.D., Gakkel, Ia.Ia., Litvin, V.M., Martynov, V.T. and Shurgaeva, N.D.: Geomorphological chart of the Arctic Ocean; TRUDY of the Sci.-Res. of the Institute of Geology of the Arctic Region, Vol. 143, M., Gosgeoltekhizdat, 1965.

17. Karelin, D.B.: Aerial expedition to the high latitudes in the Arctic Region during 1941: IZVESTIIA Vsesoiuzn. Geogr. Society, Vol. 77, Issue 3, L., 1945.

18. Cartography of the Arctic Basin now and in the past (Physiographic chart-diagram); Izd-vo Hydrogr. Service VMF, L., 1966.

p.19

19. Kiselev, Iu.G.: Several features in the contemporary morphological tectonic structure of the Lomonosov Ridge according to seismic data; Thesis-Doklad, 2, Sci.-Techn. Council on Marine Geophys. Gelendzhik, 1966.

p.20

20. Klenova, M.V.: Sediments in the Arctic Basin according to data collected during drifts by the icebreaker "G. Sedov", M., Izd-vo AS USSR, 1962.

21. Laktionov, A.F., Frolov, V.V.: On an ice-floe; L., Izd-vo "Marine Transport", 1955.

22. Laktionov, A.F.: The North Pole; L., Izd-vo "Marine Transport, 1955.

23. Levin, D.V., Kriukov, S.M., Karasik, A.M.: Aeromagnetic survey of the Central Section of the Soviet North; in symposium: "Aeromagnetic Survey in Geology", M., Gosgeoltekhizdat, 1963.

24. Libin, Ia.S., Chernigovsky, N.T.: Expedition in the Soviet Plane "N-169" to the inaccessible regions of the North Pole; M-L, 1946.

25. Lomonosov, M.V.: Brief description of several journeys across the northern seas and indications of a possible passage through the Siberian Ocean to East India; SPb, 1763.

26. Maksimov, I.V.: Study of tidal phenomena in the central section of the Arctic Ocean; Problems of the Arctic Region, 1945, #3.

27. About recent Soviet investigations and discoveries in the Central Arctic Region; IZVESTIIA AS USSR, Geographical Series, 1954, #5.

28. Ostrekin, M.E.: The latest investigations in the Central Arctic Region: NATURE, 1954, #12.

29. Rassokho, A.I., Senchura, L.I., Demenitskaia, R.M., Karasik, A.M. and Kiselev, G.G.: The Mid-Arctic Submarine Ridge and its importance in the system of ridges of the Arctic Ocean; DOKLADY AS USSR, 1967 Vol. 172, #3.

.20

30. Papanin, I., Krenkel, E., Shirshov, P. and Fedorov, E.: Scientific work on drifting ice; Soviet Arctic Region, 1937, #12.

.21 31. Saks, V.N.: Deliberations with regard to the geological history of the Arctic Region; Problems of the North; 1958, Issue 1.

32. Saks, V.N.: Geological History of the Arctic Ocean during the Mesozoic Era; DOKLADY of Soviet Geologists at the International Geological Congress, XXI Session, Problem 12, M., Gosgeoltekh-izdat, 1960.

33. Saks, V.N., Belov, N.A., Lapina, N.N.: Contemporary concept of the geology of the Central Arctic Region; NATURE, 1955, #7.

34. Northern Hemisphere; A map; scale 1 : 25,000,000; M., Izd-vo GUGK USSR, 1963.

35. Tarasov, B.V.: New in the seafloor topography of the Arctic Ocean; in symposium: "Problems of the Arctic and Antarctic Regions", Issue 8, Izd-vo "Marine Transport", 1961.

36. Timofeev, V.T.: Water masses in the central zone of the Arctic Ocean; TRUDY of the Second All-Union Geographical Convention, Volume 2, L., 1948.

37. Timofeev, V.T.: Results of deepwater hydrological observations; TRUDY of the drifting expedition of Glavsevmorputi on board the icebreaker "G. Sedov", 1937-1940, L., 1951.

38. Treshnikov, A.F.: The Arctic Region gives away its secrets; NATURE, #2, 1960.

39. Shirshov, P.P.: Scientific results obtained by the drifting Station "North Pole"; M., Izd-vo AS USSR, 1944.

.22

40. Atlasov, I.P., Egiazarov, B.Kh., Dibner, V.D., Romanovich, B.S., Zimkin, A.V., Vakar, V.A., Deminitskaia, R.M., Levin, D.V., Karasik, A.M., Gakkel, Ia.Ia., Litvin, V.M. : Tectonic Map of the Arctic and Sub-Arctic Regions; Report of the XXII Session of the International Geological Congress; Institute of Geology of the Arctic, Leningrad, 1964.

41. Atlasov, I.P., Egiazarov, B.Kh., Dibner, V.D., Romanovich, B.S., Zimkin, A.V., Vakar, V.A., Deminitskaia, R.B., Levin, D.V., Karasik, A.M., Gakkel, Ia.Ia., Litvin, V.M. : Tectonic Map of the Arctic and Sub-Arctic Regions; Extrait des Communications Scientifiques presentees a la Commission de la Carte Geologique du Monde, Paris, 1966.

41-a. Balakshin, L.L., 1959: The water circulation and floor topography of the northern section of the Greenland Sea; International Oceanographic Congress, N.Y., September, 1959; Preprints, page 430; Washington, D.C.

42. Beal, M.A., Edvalson, F., Hunkins, K., Molloy, A., Ostenso, N.A.: The seafloor of the Arctic Ocean - geographic names; Arctic, Volume 19, #3, 1966.

43. Belov, N.A., Lapina, N.N.: Relief, seafloor sediments and geological history of the Central Arctic as related to hydrological conditions; Preprints; International Oceanographic Congress, 1959, W., D.C.

44. Crary, A.P.: Bathymetric Chart of the Arctic Ocean along the route of T-3, April of 1952 to October of 1953; Geological Society of America, 65, 1954.

45. Crary, A.P., Goldstein, N.: Geophysical studies in the Arctic Ocean; Deep-Sea Research, Volume 4, #3, 1957.

46. Cromie, W.: Preliminary results of investigations of Arctic drift Station "Charlie"; Geology of the Arctic, Volume 1, University of Toronto Press, 1961.

22

47. Dietz R., Shumway, G.: Arctic Basin Geomorphology; Preprints; International Oceanographic Congress, 1959; Washington, D.C.

23 48. Fisher, R.L., Carsola, A.J., Shumway, G.: Deep-Sea Bathymetry north of Point Barrow; Deep-Sea Research; Volume 5, 1-6, 1958.

49. Harris, R.: Arctic Tides; Department of Commerce and Labor; Coast and Geodetic Survey, W., 1911

50. Hope, E.R.: Geotectonics of the Arctic Ocean and the great Arctic magnetic anomaly; Journal of Geophysics, Research, Vol.64, 1959

51. Heezen, B.C., Ewing, M.: The Mid-Oceanic Ridge and its extension through the Arctic Basin; Geology of the Arctic, University of Toronto Press, Volume 1, 1961.

52. Hunkins, K.: Seismic studies of the Arctic Ocean floor; Geology of the Arctic, Volume 1, University of Toronto Press, 1961.

53. Hunkins, K., Herron, T., Kutschale, H., Peter, G.: Geophysical studies of the Chukchi Cap, Arctic Ocean; Journal of Geoph. Research, Volume 67, #1, 1962.

54. Nansen, F.: Bathymetrical features of the North Polar Seas; The Norwegian North Polar Expedition of 1893-1896; Scientific Research, Volume 4, 1904.

55. Ostenso, N.A.: Geophysical investigations of the Arctic Ocean Basin; University of Wisconsin, Geophysical Polar Research Center; Res. Rep. Series, #4, 1962.

56. Ostenso, N.A.: Physiography of the Arctic Ocean Basin; Geol. Society of America; Special Paper, #73, pages 289-290, 1963.

57. Ostenso, N.A.: The Structure of the Arctic Ocean Basin; Geophysical Polar Research Center; Department of Geology; University of Wisconsin, 1966.

58. Reed, R., Campbell: Equilibrium Drift of the Ice-Station "Alpha"; Journal Geoph. Res., Volume 67, #1, 1962.

59. Sverdrup, H.V.: Physical Oceanography of the North Polar Basin; Arctic, Volume 3, #3, 1950.

Translated for: E.C. Buffington, NEL, Point Loma, San Diego, Calif.

Translated by: Lydia A. Hutchison, UCSD, La Jolla, California

J U N E, 1 9 6 7

GEOGRAPHICAL NAMES OF INDIVIDUAL SECTIONS OF THE ARCTIC BASIN SEAFLOOR

M.A. BEAL's LIST OF NAMES AND OTHER AMERICAN SOURCES	NAMES FROM VARIOUS SOVIET SOURCES	NEW NAMES
1. Амерасийский суббассейн Amerasia Subbasin		
1. Поднятие Бофорта Beaufort Rise		
2. Чукотское поднятие Chukchi Rise		
	3. Хребет Менделеева Mendeleyev Ridge	
4. Поднятие Альфа Alpha Rise		
5. Хребет Ломоносова Lomonosov Ridge		
		6. Отрог Геофизиков Geofizikov Spur
7. Отрог Марвина Marvin Spur		
8. Ущелье Марвина Marvin Gap		
9. Ущелье Арлис Arlis Gap		
10. Ущелье Чарли Charlie Gap		
		11. Ущелье Сотрудничества Sotrudnichestva Gap
12. Канадская котловина Canada Deep		

13. Канадская абиссальная равнина
Canada Abyssal Plain

14. Котловина Макарова
Makarov Deep

15. Абиссальная равнина Флетчера
Fletcher Abyssal Plain

16. Котловина подводников
Podvodnikov Deep

17. Абиссальная равнина Толля
Toll Abyssal Plain

18. Котловина "СП"
"SP" Deep

II. Евразийский суббассейн
Eurasia Subbasin

19. Хребет Гаккеля
Gakkel Ridge

20. Котловина Амундсена
Amundsen Deep

21. Котловина Нансена
Nansen Deep

22. Долина Лены
Lena Valley

23. Долина Седова
Sedov Valley

24. Долина Гидрографов
Gidrografov Valley

25. Поднятие Ермака
Yermak Rise

26. Ущелье Литке
Litke Gap

26. Поднятие Морриса Джезупа
Morris Jesup Rise

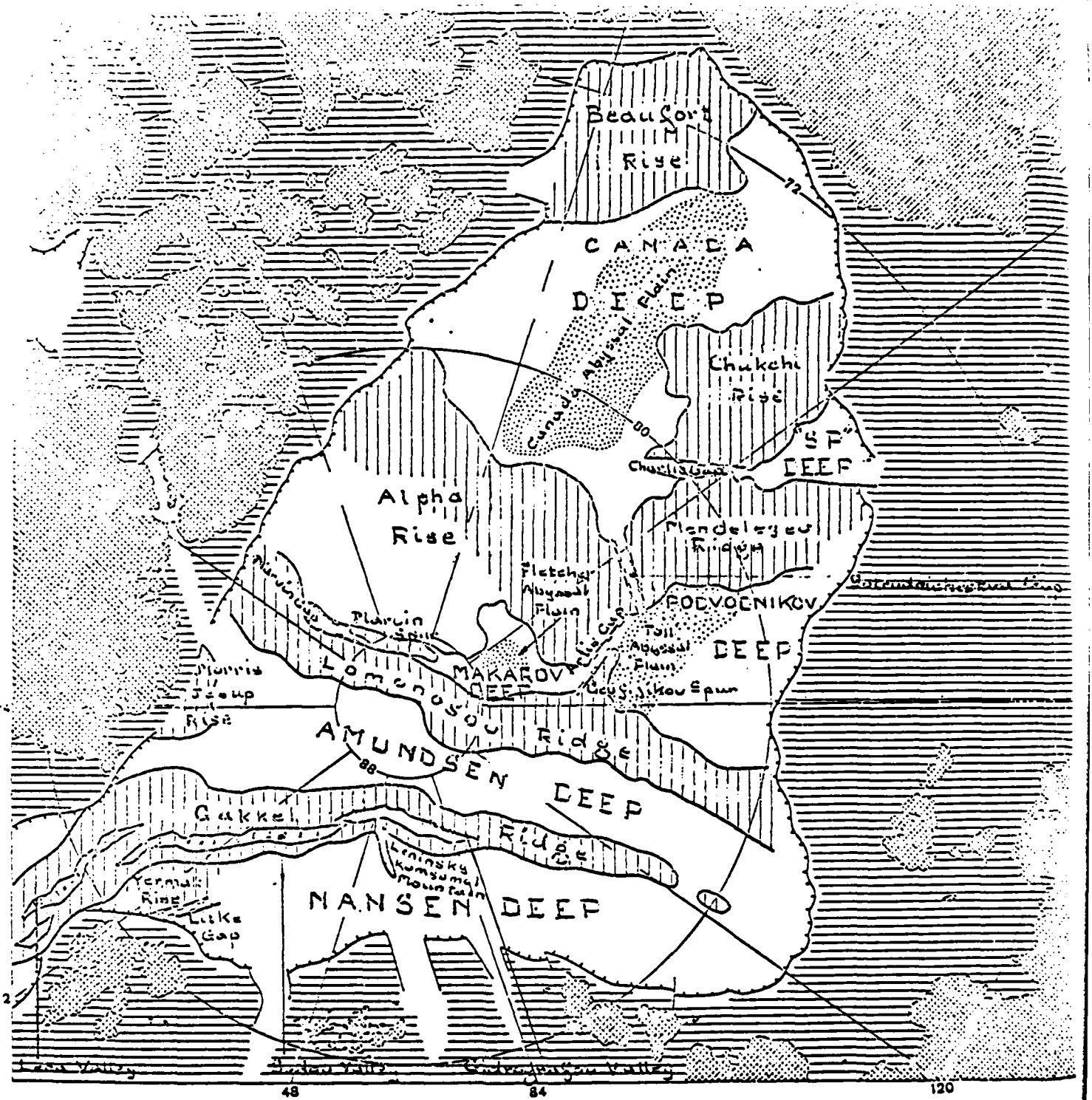
FIGURE 1

THE ARCTIC BASIN

SEAFLOOR

OROGRAPHIC CHART - LEGEND

1 - Land	2 - Shelves	3 - Submarine Ridges & Rises
4 - Oceanic Deeps	5 - Abyssal Plains	6 - Rift "valleys"
7 - "Gaps"of non-rift type	8 - Outline of the Arctic Basin (the brow of the Continental Slope)	


Beaufort Rise
CANADA DEEP
Canada Abyssal Plain
Chukchi Rise
SF DEEP
Alpha Rise
Mendeleyev Ridge
Fletcher Abyssal Plain
PODVODNIKOV DEEP
Tall Abyssal Plain
MAKAROV DEEP
LOMONOSOV Ridge
AMUNDSEN DEEP
Gakkel Ridge
NANSEN DEEP
Yermak Rise
Lütke Gap
Lena Valley
48
84
120
88
2
1 Land
2 Shelves
3 Submarine Ridges & Rises
4 Oceanic Deeps
5 Abyssal Plains
6 Rift Valleys
7 Gaps of non-rift type
8 Outline of the Arctic Basin